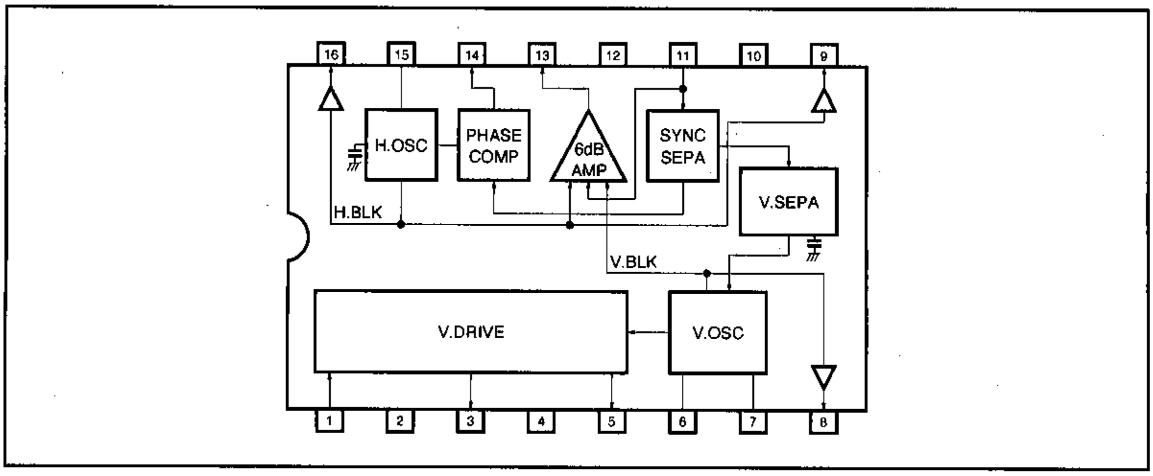
Electronic viewfinder driver
BA7149F

The BA7149F is an electronic viewfinder driver for video cameras. It separates the synchronous signal from the input video signal, and outputs the vertical deflection drive output and horizontal deflection signals. HD and VD output signals with guaranteed phase difference are also provided for on-screen displays (OSD). The differences between the BA7149F and the BA7148F are the horizontal blanking, horizontal AFC output, HD output phase and pulse width.

●Applications
Video cameras

●Features
1)Operates off a 5V power supply.
2)Built-in vertical deflection circuit.
3)Built-in wide-bandwidth amplifier.
4)Built-in HD and VD output terminals.
5)Few external components required.
6)SOP 16pin package.
7)Compatible with 10 μsec flyback pulses.

●Block diagram



●Pin descriptions

Pin No.	Function	Pin No.	Function
1	Vertical control input	9	HD output
2	Power supply 1	10	GND 2
3	Vertical deflection drive (POS)	11	Video input
4	GND 1	12	Power supply 2
5	Vertical deflection drive (NEG)	13	Video output
6	Vertical oscillator external resistor pin	14	Phase comparator output
7	Vertical oscillator external capacitor pin	15	Horizontal oscillator external resistor pin
8	VD output	16	Horizontal AFC output

●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Applied voltage	$V_{CC\ Max.}$	8.0	V
Power dissipation	Pd	500*	mW
Operating temperature	Topr	−20~75	℃
Storage temperature	Tstg	−55~125	℃

* Reduced by 5mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta=25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{CC}	4.5	5.0	5.5	V

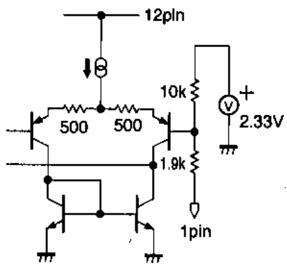
●Electrical characteristics (Unless otherwise specified Ta=25℃ and Vcc=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating current circuit	I_{CC}	31.0	42.0	55.0	mA
〈VIDEO AMP〉					
Voltage gain	G_V	5.3	6.0	6.7	dB
D range	D_{RV}	3.20	3.50	−	V_{P-P}
Frequency characteristic	f_C	−2.0	0.0	+2.0	dB
Minimum sync separation voltage	$V_{syn \cdot Min.}$	−	45	120	mV_{P-P}
Horizontal blanking width	$T_{H \cdot BL}$	9.6	10.7	11.4	μsec
Vertical blanking width	$T_{V \cdot BL}$	870	970	1070	μsec
〈Horizontal〉					
Free-run frequency	$f_{H \cdot O}$	13.9	15.7	17.5	kHz
Capture range	Δf_{CAP}	±2.1	±3.0	−	kHz
AFC output pulse width	T_{HP}	10.2	11.1	12.0	μsec
AFC lock-in phase	T_{HPH}	−1.9	−1.2	−0.5	μsec
Pulse voltage low	V_{HPL}	0.5	1.1	1.7	V
〈Vertical〉					
Free-running frequency	$f_{V \cdot O}$	51.3	54.8	58.2	Hz
Pin 3 maximum output amplitude	$V_{VP \cdot Max.}$	2.10	2.70	−	V_{P-P}
Pin 5 maximum output amplitude	$V_{VN \cdot Max.}$	2.10	2.70	−	V_{P-P}
〈$H_D \cdot V_D$〉					
Phase difference	T_{HVD}	17.3	21.3	25.3	μsec
H_D pulse width	T_{HD}	8.7	9.9	11.1	μsec
V pulse width	T_{VD}	860	960	1060	μsec
Pulse voltage low	$V_{HV \cdot L}$	−	0.1	0.3	V
Pulse voltage high	$V_{HV \cdot H}$	4.7	4.9	−	V

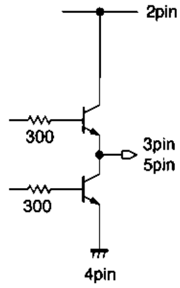
◎ Not designed for radiation resistance.

●Input/output circuits

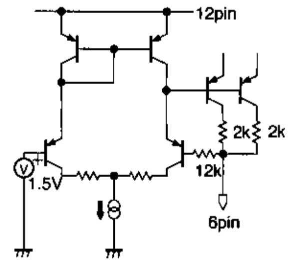
1pin



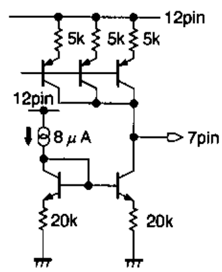
2, 3, 4, 5pin



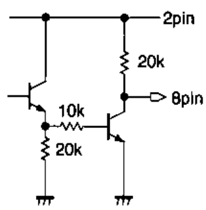
6pin



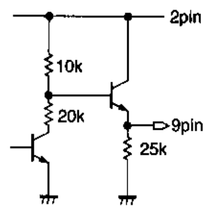
7pin



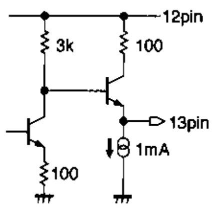
8pin



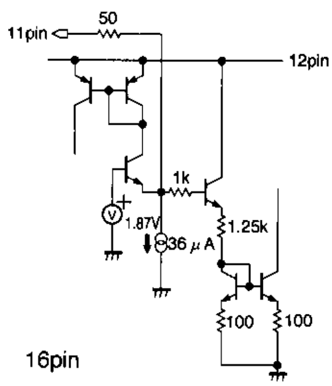
9pin



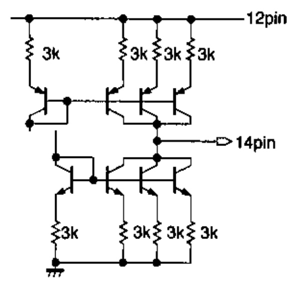
13pin



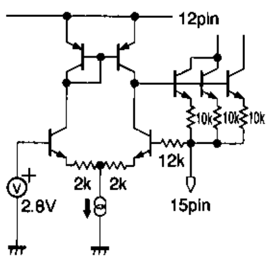
11pin



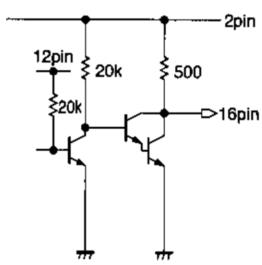
14pin



15pin

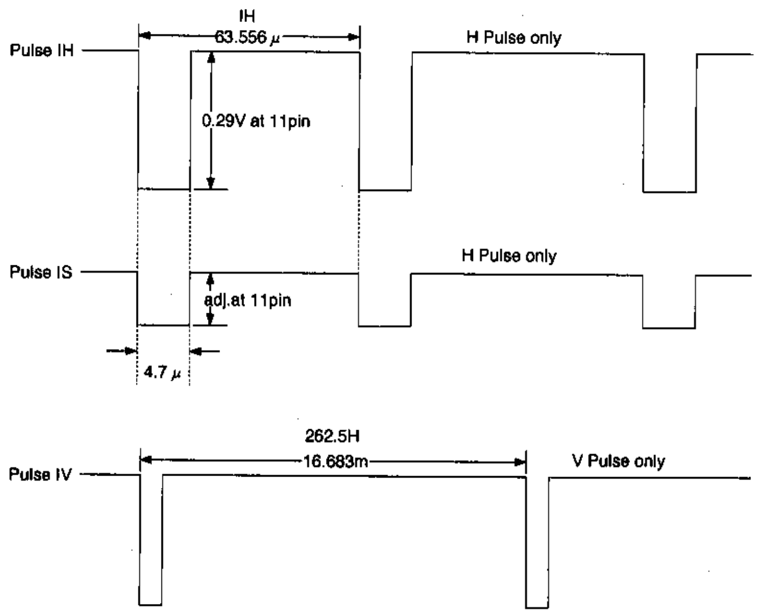


16pin



●Circuit operation

Input signals



The video signal input to pin 11 is detected by the charging and discharging of an external capacitor. Sync separation is done in the SYNC SEPA block. The H. SYNC signal is sent to the H. OSC, and the V. SYNC signal is sync-separated in the vertical sync pulse interval and supplied to the V. OSC block.

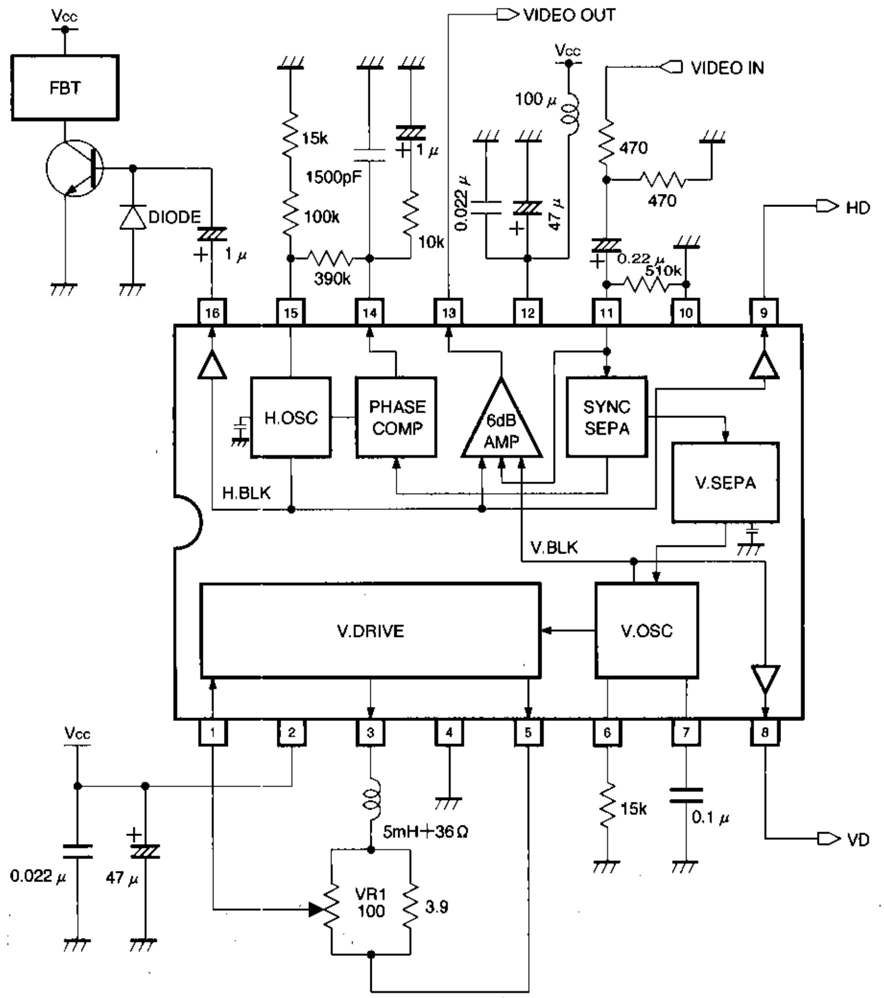
The H. OSC block consists of a PLL that oscillates in sync with the sync-separated H. SYNC signal, and outputs the HD pulse and horizontal deflection pulse.

In the V. OSC block, a direct-control method is used with the sync signal. To synchronize the vertical oscillator circuit, the inherent oscillation period of the oscillation circuit is made slightly larger than the vertical sync signal period, so that the sync signal always enters slightly early.

The oscillator output alone is not enough to ensure stable operation for the vertical deflection output circuit, so it is amplified by the V. DRIVE block.

The horizontal and vertical blanking signals generated in the H. OSC and V. OSC blocks are used to erase the horizontal retrace line from the video signal input to pin 11. The signal is inverted and amplified by a 6dB inverting amplifier and output as a negative-polarity video signal.

● Application example

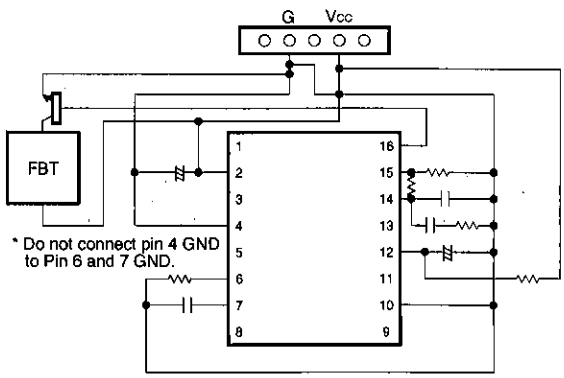


*1 The resistors connected to pins 6 and 15 should have a tolerance of ±2%, and a temperature coefficient of ±100ppm or lower.

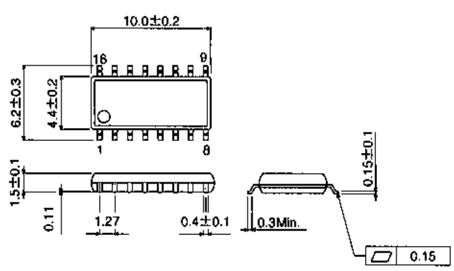
*2 The capacitor connected to pin7 should have a tolerance of ±5%, and a temperature coefficient of ±250ppm or lower.

●Operation notes

1. H. OSC free-run frequency and capture range
   The free-run frequency is determined by the 115kΩ resistor connected between pin 15 and GND. The capture range is varied by the resistors and capacitor connected to pins 14 and 15.
   The free-run frequency and capture range for this IC are guaranteed for these circuit constant values, and we recommend that you use them. The resistor 115kΩ connected between pin 15 and GND should have a tolerance of ±2%, and a temperature coefficient of ±100ppm or lower.
2. V. OSC free-run frequency
   The V. OSC free-run frequency is determined by the 15kΩ resistor connected between pin 6 and GND, and the 0.1 μF capacitor connected between pin 7 and GND.
   The free-run frequency and capture range for this IC are guaranteed for these circuit constant values, and we recommend that you use them. The resistor 15kΩ connected between pin 6 and GND should have a tolerance of ±2%, and a temperature coefficient of ±100ppm or lower, and the capacitor connected between pin 7 and GND should have a tolerance of ±5%, and a temperature coefficient of ±250ppm or lower.
3. Use with PAL systems
   In PAL systems, change the value of the resistor connected between pin 6 and GND to 18kΩ.
4. PCB pattern
   The large-signal systems and small-signal systems in the IC have been kept separate, and the external wiring must also be done in such a way to prevent interference from occurring. In particular, to prevent the FBT return current from interfering with the V. OSC circuit on pins 6 and 7, do not directly connect the pin 4 GND and pin 6 and 7 GND.



●External dimensions (Units: mm)



SOP16